OBJECTIVES: Preventive therapy has been accepted as a standard protocol to reduce morbidity and mortality from tuberculosis in HIV-infected patients. Conventional cost-effectiveness analyses attempt to assess superiority of one therapy over another in terms of monetary benefit. The present study tries to determine variables that are not considered in conventional cost-effectiveness analyses but which are likely to have significant impact on disease outcome.
METHODS: Based on MEDLINE search, compilation and analysis of cost-effectiveness analyses of preventive therapy for tuberculosis in HIV-infected populations from 1995 to 2001.
RESULTS: Standard preventive therapies employed are: isoniazid daily for six months; rifampicin plus pyrazinamide twice weekly for two months; isoniazid plus rifampicin daily for three months. Variables considered were medical care costs, social costs and cost per QALY saved, i.e., which can be measured in terms of monetary benefit. Isoniazid has been considered the most cost-effective option. Important variables not considered were risk of resistance—primary (isoniazid resistance 16.67%, rifampicin 6.67%) or secondary (isoniazid resistance 61.76%, rifampicin 70.59%)—to the same patient upon diagnosis of active tuberculosis and/or to the community exposed; morbidity from adverse drug reactions and drug interactions with anti-retroviral drugs.
CONCLUSIONS: Indiscriminate prophylaxis can increase the chances of primary and secondary resistance and morbidity from adverse drug reactions and drug interactions. Study models to include these variables in conventional cost-effectiveness analyses are needed to assess the actual benefit of preventive therapy.

PMI20

A REAL OPTION APPROACH TO VALUING PHARMACEUTICAL INVESTMENTS AND FIRMS

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OBJECTIVE: This paper presents a model based on real-option analysis for evaluation of R&D in the pharmaceutical sector, both for start-up ventures as well as for big conglomerates. The analysis will be illustrated by means of a case study and shows the valuable contribution of real-option analysis compared to conventional DCF-analysis.
METHODS: The key understanding is that R&D projects can be seen as growth options. The growth-option framework looks at pharmaceutical investment projects as a sequence of options, which differs from a conventional DCF-analysis by incorporating the possibility of stopping the project when a subsequent phase is not valuable (abandon the option), and of continuing the project (exercise the option) when it is valuable. Traditional valuation techniques such as DCF-analysis fail to fairly evaluate innovative companies because most of the value of R&D projects is embedded in unexercised real options whose future value is uncertain at this moment. If one considers a company as a portfolio of real options, one can value the projects or the company based on an option model.
RESULTS: The case study illustrates that real-option analysis typically results in a higher project value than conventional DCF-analysis would reveal. Real-option analysis better reflects the fundamental value of the project or of the company, which cannot be captured by DCF-analysis.
CONCLUSION: This paper presents a new methodology for evaluating pharmaceutical R&D based on real-option models. As such, the real-option framework is better in explaining the recent stock price behavior of biotech and pharmaceutical firms.

PMI21

ESTIMATING INFLUENZA-RELATED EXCESS HOSPITAL ADMISSIONS

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OBJECTIVES: It is difficult to accurately assess the impact of influenza on hospital admissions. Most influenza admissions are not coded as such, since the reason for admission is usually an underlying condition exacerbated by influenza. The difficulty of assessing the excess burden is complicated by the nature of commonly associated conditions such as pneumonia, heart failure, and respiratory disease, all of which exhibit similar seasonal variations in numbers of hospitalizations. The objective is to remove the seasonal variation to estimate the fluctuations attributed to influenza during epidemic periods.
METHODS: We used a structural time series model that included a stochastic trend and a trigonometric seasonal function. Dummy variables (1 during influenza epidemic, otherwise 0) were used to capture the excess hospitalizations over and above those that occur due to typical seasonal fluctuation. Weekly hospital data on pneumonia and influenza, all other respiratory conditions, and congestive heart failure were modeled for public hospitals in England and Wales.
RESULTS: The models explained between 72% and 95% of the variation in hospital admissions for the relevant diagnostic groups (except CHF, explained variance 43%). We found a one-week lag in two models reflecting the time elapsed between diagnosis and admission. Mean numbers of excess admissions over a 10-year period were: high risk 17,857 (range 12,779–26,104); elderly 17,856 (10,869–28,966); adult 4,820 (3,175–7,453).
CONCLUSIONS: Estimation of the burden of excess hospitalizations must take account of underlying seasonal variations. Traditional methods of estimation, such as comparing epidemic and non-epidemic periods, are of limited value. Furthermore, because much of the excess hospital burden of influenza can be hidden (admission codes reflect underlying conditions or complications), it is necessary to take into account the variations in a wide range of conditions.